Movement Patterns of Radio-Tagged Adult Humpback Whitefish in the Upper Tanana River Drainage

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January 2002

Abstract.—Radio telemetry technology was employed to track the movements and locate critical habitats of adult humpback whitefish in the upper Tanana River drainage. Ninety-five transmitters were surgically implanted in humpback whitefish in three locations in the spring and summer of 2000 and 2001. Their movements were monitored for several months using boat and aerial tracking techniques. Relocations suggest that adults frequent lake habitats in the spring and early summer, and move from lake to river habitats by mid to late summer. By late fall, most tagged fish were concentrated in two discrete upstream regions of the drainage; one in the Nabesna River, 15 to 30 km upstream from its mouth, and the other in the Chisana River, 80 to 100 km upstream from its mouth. These regions are thought to be spawning areas. By winter all tagged fish had dropped back downstream into regions of the Tanana River or in the Tetlin Lake system, where they appeared to be overwintering. A selection of feeding, spawning and overwintering areas, all critical habitats for humpback whitefish, have been located. Rearing areas for juvenile fish have not been located.

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Introduction

Concerns have recently been voiced about possible declines in humpback whitefish *Coregonus pidschian* populations in the upper Tanana River drainage. Local subsistence fishers have spoken to Tetlin National Wildlife Refuge personnel directly (B. Schulz, U.S. Fish and Wildlife Service, Kanuti National Wildlife Refuge, personal communication) and have voiced concerns at the Eastern Interior Federal Subsistence Advisory Council meetings as well. The main issue seemed to involve a perception that humpback whitefish, the primary species targeted in local subsistence fisheries, were less abundant now than they were in the past.

Addressing local residents' perceptions of reduced abundance of humpback whitefish directly, without baseline information about previous stock status for comparison, is not possible. Data regarding stock or population numbers are not available. Neither spawning nor wintering areas have been identified. Juvenile rearing areas are unknown. Movement patterns within the upper Tanana River drainage, as well as possible migrations far outside the region, have not been confirmed or refuted. Knowledge of important habitats for humpback whitefish in the area, as well as some understanding of their seasonal and annual movement patterns, is required before any real problems can even be identified with confidence. Management action intended to remedy identified problems would have to follow. Interpreting movement patterns and recognizing the importance of seasonal locations requires a basic understanding of humpback whitefish biology and life history. A brief synopsis follows.

Humpback whitefish and their close relatives, referred to by McPhail and Lindsey (1970) as the "*Coregonus clupeaformis"* complex, are widely distributed across northern North America and Asia (Figure 1). Fleming (1996) presents age distribution data from a spawning population sampled on the Chatanika River in interior Alaska, suggesting that median ages are in the neighborhood of 9 or 10 years. Reist and Bond (1988) suggest that maximum ages may be as high as 20 years or more on the Mackenzie River in northern Canada. And Power (1978) presents a convincing image of a sectioned otolith from a fish captured in Quebec, which he

estimated to be 57 years old. It is clear that the species is capable of growing very old.

Spawning maturity is reached by 4 to 8 years of age, is variable depending on sex and location, and individuals can spawn multiple times (Alt and Kogl 1973; Alt 1979; Reist and Bond 1988; Fleming 1996). Large females may produce 50,000 or more eggs for each spawning event (Townsend and Kepler 1974). Like all whitefish species, they spawn in freshwater in the fall. However, several different life history scenarios are possible for the species. They inhabit and spawn in large lake systems, they are found in brackish water near the mouths of the rivers they inhabit, and they migrate along river corridors and spawn in flowing water (Bidgood 1974; Alt 1979; Reist and Bond 1988; Lambert and Dodson 1990; Fleming 1996).